

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

Claims 1-10 (Canceled).

11. (New) A Raman amplifying device for amplifying signals ($S_1, S_2 \dots S_n$) with wavelengths $\lambda_{S1}, \lambda_{S2} \dots \lambda_{Sn}$ comprising an optical path, pump sources ($P_1, P_2 \dots P_N$) for generating a plurality of Raman pump signals ($\lambda_1, \lambda_2, \dots \lambda_N$) for backward pumping and means for coupling ($2_1, 2_2, \dots 2_N$) the plurality of Raman pump signals into the optical path, wherein the plurality of optical Raman pump signals are time-division multiplexed by multiplexing controlling means ($4_1, 4_2, \dots 4_N$)

characterized in that the time-division multiplexing frequency is higher than the minimal corner frequency f_c of the co-propagating pump-to-signal modulation transfer function among the co-propagating pump-to-signal modulation transfer functions that implicate the signals ($S_1, S_2 \dots S_n$) and the pumps ($P_1, P_2 \dots P_N$):

$$f_c = \min_{i,j} \left\{ \frac{\alpha_{P_i}}{2\pi \left| \frac{1}{V_{S_j}} - \frac{1}{V_{P_i}} \right|} \right\}$$

where V_{Sj} and V_{Pi} are the group velocities of the signal Sj and the Raman pump signal Pi , α_{Pi} is the attenuation of the fiber at the pump wavelength λ_{Pi} .

12. (New) A Raman amplifying device for amplifying signals ($S_1, S_2 \dots S_n$) according to claim 11

characterized in that the controlling means multiplex the pumps in time so that the pumps that give significant gain to a signal S_k and the pumps that do not give significant gain to the signal S_k are alternated in time at a frequency that is higher than the minimal corner frequency f_c of the co-propagating pump-to-signal modulation transfer function among the co-propagating pump-to-signal modulation transfer functions that implicate the signal S_k and the pumps P_N ($P_1, P_2 \dots P_N$) that give significant gain to S_k :

$$f_c = \text{MIN}_i \left\{ \frac{\alpha_{Pi}}{2\pi \left| \frac{1}{V_{Sk}} - \frac{1}{V_{Pi}} \right|} \right\}$$

where V_{Sk} and V_{Pi} are the group velocities of the signal S_k and the Raman pump signal Pi , α_{Pi} is the attenuation of the fiber at the pump wavelength λ_{Pi} .

13. (New) Raman amplifying device according to claim 12 characterized in that the controlling means multiplex the pumps in time so that the pumps that give significant gain to a

signal S_k and the pumps that do not give significant gain to the signal S_k are alternated in time at a frequency that is higher than the maximal corner frequency f_c of the co-propagating pump-to-signal modulation transfer function among the co-propagating pump-to-signal modulation transfer functions that implicate the signal S_k and the pumps $(P_1, P_2 \dots P_N)$ that give significant gain to S_k :

$$f_c = \text{MAX}_i \left\{ \frac{\alpha_{P_i}}{2\pi \left| \frac{1}{V_{S_k}} - \frac{1}{V_{P_i}} \right|} \right\}$$

14. (New) Raman amplifying device according to claim 12 characterized in that the controlling means multiplex the pumps in time so that the conditions expressed for S_k are fulfilled for all the signals S_k , $k=1$ to n .

15. (New) Raman amplifying device according to claim 13 characterized in that the controlling means multiplex the pumps in time so that the conditions expressed for S_k are fulfilled for all the signals S_k , $k=1$ to n .

16. (New) A Raman amplifying device according to claim 11 with a fiber wherein this fiber has a reduced corner frequency of the co-propagating modulation transfer functions.

17. (New) Method for time multiplexing a plurality of Raman pump signals in a amplifying device for amplifying signals ($S_1, S_2 \dots S_n$) with wavelengths $\lambda_{S1}, \lambda_{S2} \dots \lambda_{Sn}$ comprising an optical path, pump sources ($P_1, P_2 \dots P_N$) for generating a plurality of Raman pump signals ($\lambda_1, \lambda_2, \dots \lambda_N$) for backward pumping and means for coupling ($2_1, 2_2, \dots 2_N$) the plurality of Raman pump signals into the optical path, wherein the plurality of optical Raman pump signals are time-division multiplexed by multiplexing controlling means ($4_1, 4_2, \dots 4_N$) characterized by the step:

multiplexing the pumps in time so that the time-division multiplexing frequency is higher than the minimal corner frequency f_C of the co-propagating pump-to-signal modulation transfer function among the co-propagating pump-to-signal modulation transfer functions that implicate the signals ($S_1, S_2 \dots S_n$) and the pumps ($P_1, P_2 \dots P_N$):

$$f_C = \min_{i,j} \left\{ \frac{\alpha_{Pi}}{2\pi \left| \frac{1}{V_{Sj}} - \frac{1}{V_{Pi}} \right|} \right\}$$

where V_{Sj} and V_{Pi} are the group velocities of the signal Sj and the Raman pump signal Pi , α_{Pi} is the attenuation of the fiber at the pump wavelength λ_{Pi} .

18. (New) Method according to claim 17 comprising the step:
- multiplexing the pumps in time so that none of the noises at wavelength λ_{S1} and λ_{S2} and ... λ_{Sn} that co-propagates with the pump experiences high variations of gain in time.